CLINICO PATHOLOGICAL STUDIES OF CORNEAL ULCER

THESIS

FOR

MASTER OF SURGERY

(OPHTHALMOLOGY)

BUNDELKHAND UNIVERSITY

JHANSI (U. P.)

1992

SUSHIL KUMAR

CERTIFICATE

This is to certify that the work entitled "CLINICO PATHOLOGICAL STUDIES OF CORNEAL ULCER" which is being submitted as THESIS for M.S. (OPHTHALMOLOGY) examination 1992. Bundelkhand University, by Dr. SUSHIL KUMAR has been carried out in the department of ophthalmology.

He has put in the necessary stay in the department according to University regulations.

Dated: 30th Sept 92

(G. D. GUPTA)
MS, DOMS
Associate Professor and Head
Department of Ophthalmology
M.L.B.Medical College,
JHANSI (U.P.)

CERTIFICATE

This is to ceritfy that the work entitled "CLINICO PATHOLOGICAL STUDIES OF CORNEAL ULCER" which is being submitted for M.S. (OPHTHALMOLOGY) THESIS by Dr. SUSHIL KUMAR, has been carried out under our supervision and guidance in the Department of Ophthalmology and Microbiology. The techniques embodied in the thesis were under taken by the candidate himself and the observations recorded have been periodically checked by us.

He has fulfilled necessary requirements of the stay in the department for the submission of the thesis .

(VIJAY KUMAR MISURYA)
M.S
Assistant Professor
Department of ophthalmology
M.L.B. Medical College,
JHANSI (U.P.)
(GUIDE)

(G.D. GUPTA)
M.S.,D.O.M.S.
Associate professor and Head
Department of Ophthalmology
M.L.B. Medical College
JHANSI (U.P.)
(CO-GUIDE)

(R.K. AGARWAL)
M.D.
Associate Professor and Head
Department of Microbiology
M.L.B. Medical College
JHANSI (U.P.)
(CO-GUIDE)

ACKNOWLEDGEMENTS

This yet another milestone in my life was been reached with the help of kind blessings of the Almighty. Even the best caligraphy cannot sufficently express my gratitude to those, who with such good grace gave a bucketful of strength to me in completion of the present work.

It was my proud privilage to have been associated with and remain under constant vigilence of Dr. Vijay Kumar Misurya, M.S., Assistant Professor, Department of Ophthalmology, M.L.B. Medeical College, Jhansi, throughout the period of working on this thesis. The joy and experience of working under his guidence is really something out of this world. His invaluable suggestions, constructive ctricism, meticulous attention to details and never to be matched expertise has been primarily, if not singularly, responsible for completion of this work in its present form. He has been a constant source of encouragement and guidance in moments of despair and it is virtually impossible to express in words my deep sense of indebtedness and profound gratitude to him.

It was still more a matter of proud to have worked under Honorable teacher Dr. G.D. Gupta, M.S., D.O.M.S., Associate Professor, and Head of the Department of Ophthalmology, M.L.B. Medical College, Jhansi. I am emotionally overwhelmed and unable to express my deep debt of gratitude to my esteemed teacher. His examplary dedication, punctuality, unfathomed knowledge and experience shall remain a constant source of inspiration in my life. I take this opportunity to express my sincere acknowledgements to him.

I express my sincere indebtness to Dr. R.K. Agrawal, M.D. Associate Professor and Head of the Department of Microbiology, whose timely and constructive criticism, keen interest and painstaking efforts to mould this work

have been extremely fascinating and outstanding. His humanitarian attitude and helpful nature has cast an indelible impression over the canvas of my mind.

I owe all my career as a student to my parents, sister, brother in law. Their constant blessings, encouragement, moral support and facilities provided can never be ignored. The extension of their helpful hand is beyond all limits and expectations. I am proud of them and bow my head as a mark of respect and love.

I am sincerelly thankful to Mr. Avinash Shivani and Mr. Prem Prakash Agrawal for their assiduous and skillful computer typing for present thesis.

I owe a deep debt of gratitude to the patients, who submitted themselves for the detail examination and to all those who took simultaneous pain with me, without whose co-operation the present study could not be made success. I shall be thankful to them for ever.

I am proud and grateful to my wife Dr. Sunita, M.D., Whose emotional support conjured and lend me great strength and will to complete this work.

I shall remain indebted to my in-laws who shared the thick and thin with my struggling and stressful period of life.

Sushil Kumar

Dated : 30 Sept 92 **(SUSHIL KUMAR)**

CONTENTS

INTRODUCTION

INTRODUCTION

Corneal ulceration is a characteristic ophthalmic ailments which has frequently made people blind. It is one of the common ocular lesion which causes great morbidity. The Corneal ulcer is responsible for a fair percentage of blindness. It leads to corneal opacity and sometimes it leads to even loss of eye, making huge number of persons visually handicapped. The corneal ulcer not only puts the eye in a position of optical disadvantage but also opens a dangerous portal for the infection to inner structures.

Corneal ulcer occurs most commonly in poor class of people who are daily wages earners. It is generally observed that corneal ulcer are more common and take much longer time to heal in debilitated and ill nourished people.

A large number of etiological factors such as infective, toxic, nutritional and occupational have been shown to be responsible for the causation of corneal ulcer. Corneal ulcerations are divided into two morphological types: Central and Marginal.

Central corneal ulceration may be a result of bacteria, fungal, or viral agents. Bacterial and fungal corneal ulcers are characterised by a defect of corneal epithelium with surrounding polymorpho-nuclear leucocyte and round cell response which causes a dense white infilterate. These are associated with hyperaemia and chemosis of the conjunctiva with a purulent or

serous discharge. The ulcer may progress to frank corneal necrosis and occasionally a general ring ulceration may develop.

Corneal ulceration are associated with extreme photophobia, pain, redness,swelling and a copious discharge. The degree to which the visual activity is decreased depends on the location and severity of the ulceration.

Marginal corneal ulcer (keratitis) are characterised by focal, multifocal or diffuse ulcerative, infiltrative, or vascular envelovement of the peripheral cornea. The most common pathogen associated with peripheral corneal ulcer are staphylococcus aureus, hemophilus influenzae,moxaxella lacunata. Herpes simplex and chlamydial microorganism may cause typical peripheral corneal ulcer disease.

diopathic degenerative or dystrophic ulcers, such as Mooren's ulcer may also be associated with infiltration. Dystrophic ulcerations must be differentiated from the peripheral corneal ulcerations associated with systematic diseases such as rheumatoid arthiritis, systemic lupus erythematosus, polyarteritis and scleroderma.

For optical regions cornea proper is avascular but the region of the limbus has superficial marginal plexus. This is situated almost entirely in superficial layers and occupies an area corresponding to a triangle. The apex of which lies at the termination of Bowmann's membrane while the base against the episcleral tissue & superficial part of the sclera.

Cornea is supplied by opthalmic division of 5th corneal nerve via the ciliary nerves and those of the surroundings conjunctiva. The ciliary nerves enter the sclera from the perichoroidal space, a short distance behind the limbus. They anastomose with each other and with the conjunctival nerves forming pericorneal plexus at various levels. The nerves pass into the cornea as 60-80 myelinated trunks at its junction's with sclera. They loose their myelin sheath within 1mm of their entrance into the substantia propria and then divide into two groups i.e. anterior and posterior.

Cornea plays an important role in absorption of topicallty applied drugs and wound repair after anterior segment surgery or trauma. Its primary function is to act as a powerful optical lens of fixed focus that transmit light in an orderly fashion for proper image formation. Cornea is a living tissue, physiologic processes unique to the cornea are involved in maintaining this transparency. The absence of blood vessels contributes to corneal transparency as well as its privileged immunologic status.

For the cornea to function as a lens, the air corneal interface, where most of the refractive power of eye originates,must be a high quality optical surface. It is the primary function of tear film to provide such a surface. Secondary function of the tear film is lubrication of the eyelids during blinking and antibacterial action mediated by lysozyme and betalysin, two bacterial enzymes present in tear films.

Normal conjunctival and corneal epitheliums are constantly bathed in and protected by a fluid film. This is derived from both lacrimal secretion and secretion of the conjunctival glands is of a colloid nature. It has a regulated composition,viscosity and wetting potential,so balanced,that it remains optically clear. It is constantly renewed due to constant desquamated cellular contamination. It also acts as a medium for gaseous exchange. Film also acts as diluent and hence protects epithelium against irritation, which might result even with commonly employed drug solutions. Any change of physiochemical nature in this film results in changes in epithelium and underlying corneal stroma.

Physiologically they guard the integrity of corneal stroma. The importance of their structure in maintaining the normal transparancy of the stroma has been demonstrated by Cogan. He showed that it is essential to keep cornea relatively dehydrated. This is maintained due to permeability property of these two structures. They act as semipermeable membrane and as such let water pass through, but not electrolytes with the fluid film outside the cornea and aqueous in the anterior chamber. An osmotic gradient keeps the stroma in a detergescent and clear state. Sclera having no such mechanism is completely opaque and dehydrated. Any condition which leads to reversal of this mechanism leads to imbibition of fluid and formation of bullae. Temporary reversal and cleaning of the cornea is possible if a drop of glycerine is placed over the cornea.

Regeneration of the epithelium occurs at a faster rate and without any scar tissue formation. This regeneration is impeded by local anaesthetics and drugs. This accounts for the rapid regeneration and healing of epithelium in a bandaged eye. Growth sometimes occurs over the underlying necrosed cornea which results in recurrent erosions. Functional integrity of trigeminal nerve termination is essential for normal metabolism of epithelial cells. Epithelium has high metabolic rate and it is sensitive to nutritional disturbances.

Stroma recieves its nourishment by a process of simple diffusion of intraocular fluid from the periphery. Diffusion takes place directly from the vascular plexus round the limbus. Diffusion also occurs from the semipermiable epithelium and endothelium. The metabolism of corneal stroma is extremely slow. Diffusion takes place throughout the substance of the cornea.

The evolution of corneal ulcer can be divided into 4 stages:

- Progressive infiltration, Active ulceration, regression and cicatrization.

Progressive infiltration is characterised by infiltration of polymorpho-nuclear leokocytes or lymphocytes into the epithelium and stroma.

Active ulceration results from necrosis and sloughing of the epithelium and involved stroma. The clinical signs of active ulceration include a greyish white swollen cornea with necrosis of the ulcer

base, reactive Hyperemia, anterior uveitis and blepharospasm with pain, photophobia, lacrimation and decrease of visual acuity.

Hypopyon may manifest depending on the severity of the infection. Ulceration may progress by lateral extension resulting in diffuse. Superficial ulceration and infiltration of the cornea or it may progress by deeper penetration of the infection, leading to descemetocele formation and possible corneal perforation.

Regression is induced by the natural host defence mechanisms or by the treatment augmenting the host response. A line of demarcation develops, which consists of leukocytes that neutralize and eventually phagocytize the offending organism and necrotic material may result in initial enlargement of ulcer.

In cicatrization healing continues by progressive epithelialization of the ulcer, with subsequent scarring as a result of the layering of new stromal lamellae by fibroblasts and the continued removal of the residual debris. The stroma thickens and fills in under the epithelium, pushing the epithelial surface anteriorly. The new stromal development may completely fill the defect, and in minimally infected corneas the scarring may disappear or the repair process may leave a small depressed area with an underlying scar. The degree of scarring following ulceration varies. Small scars form nebulae, larger slightly denser are reffered as maculae and diffuse dense corneal scars are termed leukomas. The present study was undertaken with following objectives:

AIMS OF STUDY

1. To determine the role of bacteria and fungi in the causation of corneal ulcer.

2. To determine the role of viruses in causation of corneal ulcer.

3. To find out the incidence of corneal ulcer in individual of different occupation.

4. To determine the role of different types of injuries, vegetable and otherwise for causation of corneal ulcer.

5. To establish the role of nutrition in causation of corneal ulcer.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

HISTORY

Inflammation of the cornea has been recognised since early medical writings, by James Wardrop (1782-1869), whose "essays on morbid Anatomy of Human eye" appeared in 1808, described inflammatory disease of the cornea and termed the condition as keratitis.

Inflammatory conditions of the cornea are unique when compared to those in other structures in that they usually produce a disturbance in function because of alteration in transparency.

In Galen's ocular pathology and treatment (131-210 AD., cited by Wood's Encyclopedia) a reference made to the treatment of corneal ulcer even today has a sound medical basis. The chief aim of treatment is to keep the ulcer clean for the nature on its part will itself fill out the excavation and lead to cicatrization. For the treatment of these ulceration ancients advised various remedies. One of these was the juice of goat shorn plant,used until the ulcer become clean. Occasionaly honey was added to goatshorn juice. Egg white or milk were also used.

Aetins of amida (502-575 A.D.) a Byzantine ophthalmologist of the middle age presented a good description of corneal diseases, "on the cornea occur foggy and cloudy spots,tiny marginal ulcers,superficial ulcer,abscess, excavated ulcer,rough like Ulcer,rupture proptosis, etc. Pit ulcers and hollow ulcers were differentiated. He also described corneal inflammation in association

with a purulent lid infection,which correspond to our present concept of blepheritis.

Hypopyon associated with corneal ulceration was frequently reffered in early writings.In days of Galen one used to cure patients uprighrt. Many early authors advocated paracentesis as a treatment for this condition by introducing the needle obliquely at the corneal margins. An Italian author of nineteenth century,Scarpa,candemned the removeal of the hypopyon through a corneal opening. He treated corneal ulcer by the application of a crayon of murcury nitrate.

In old days antiseptic lotions were used as tincture of iodine, lodoform, quinine acriflovin,but now have been discarded as they are very irritating and have devitalizing action on the tissue.

In the recent years treatment of corneal ulcer has completely changed by the achievement of sulpha drugs and antibiotics. Jhonston was the pioneer in introducing penicillin and sulpha drugs in Hypopyon corneal ulcers and later on Goldeburg Knitora, sorsby, Huggas and cameran confirmed it seperately. Since the use of sulpha and Penicillins many newer antibiotics including broad spectrum antibiotics have come up and their role has been worked out by different workers in recent years.

NUTRITIONAL FACTOR

Nutritional factor has been discussed by various workers in past years. Different workers have pointed out the role of different components of nutrition.

PROTEINS : Proper nutritional status alone can ensure proper wound healing. Harvey and Howes (1930) assert on the basis of experimental work that maximum strength of the wounded tissue in an animal on high proteins diet is attained almost about two days earlier than an animal on standard diet, certain aminoacid, have been shown by schaffer (1948) to materially reduce the healing period of corneal lesions, chief of them are cysteine, proline, Asparagine and glutamine.

Dianobol (methadianone) helps in healing of corneal ulcer,This report was publisbed by Duke elder in 1938. Later on Bishit (1963),Roy (1964) and Prashad etal (1969) have confirmed that dianobol enhances the healing of corneal ulcer.

VITAMINE A : Cornea is an epithelial structure. Epithelia in general needs vit A for their health and activity since it is essential for the proper Colloidal Character of their tissue proteins. Friedenwald et al (1945) showed that vit A deficeincy ihibits mitotic activity. Vit A deserves being called the antiinfective vitamin as stated by Mccarrison (1945). Jonsan et al (1942)stated that Vitamin A has got indirect role in that it enables proper utilization of Vitamin C.

Mathur et al (1953) after their extensive experimental and clinical study concluded that administration of vitamin A in cases of corneal ulcer helps in reducing botgh the healing time and density of the scar. Vitamin C : In deeper ulceration where the healing is involved repair by fibroblastic prolifiratin vitamin C is indespensible because without it fibroblasts do not lay down collagen which matures to

adult fibrous tissue, as stated by Moore et al (1948) and Wright (1952). Duke elder (1938) mentioned vitamin C deficiency causes Lacrymation and keratoconjunctivitis leading on to ulceration.

NICOTINIC ACID : Krishan Dutta (1953) after his experimental study, stated that subconjunctival admintration of nicotinic acid helps much in healing of corneal ulcer and reduces the period of hospitalization.

Sood et al (1967) found their 50% of corneal ulcer were having nutritritional deficiency . Their 70% cases of below one year age were also having keratomalacia.

TRAUMA : Dickson (1942) found trauma to be the most important causative factor in causation of corneal ulcer.

OCCUPATION

In 1991 Madan Upadhayay et al while working on predisposing factor and etiological diagnosis of corneal ulcer found that ulcerations occured most frequenyly in patients 41 to 50 years of age and was rare in extremely young and extremely old patients. In several, cases ulceration was evenly distributed between males and females in all age groups except in the 11 to 20 years old and in 61 to 70 years old, in whome twice as many males as female had ulcers. According to them farmers 49.6% housewife 22.5%, students 9.9%, office workers 6.9%, children 4.9%, labourer 3.5%. Nema et al (1966) said that in their cases trauma was the most

important cousatiue factor. Sood et al also found trauma to be the most common (76.3%) cousative factor.

Dickson (1942) in his one series had majority of cases from following occupation miners (31%) engineers 17.2%, labourers 14%, shipbuilding 9%. In his other series studied at different places he got miners 56%, engineers 23% and labourers 21% as ceses of corneal ulcer. Nema and Shukla (1966) concluded that corneal is most prevalent in farmers and had following analysis farmers 27.71%, student 6.7% others 11.5%.

BACTERIAL INFECTION

Browing (1927) found pneumococcus to be the commonest organism responsible for causation of corneal ulcer. Mcnoob 1927 reported for pneumococcus and staphylococcus Aureus to be the cheif organism found in corneal ulcer.

Patterson (1932) found staphylococcus Aureus and staphylococcus albus ,pneumococcus and pseudomonas pyocyaneous to be the cief organism .

Dickson,(1942) ,published two different series. One series showed diptheroids 26.9% ,Staph. albus 14.8% , pneumococcus 14% and in other series staph . aureus ,Diptheroid,pneuemococcus and staph. albus were the most comman organism. Julor and young (1945) reported staph. Pyogenes, streptococcus, pseudomaos pyocyaneous , pneumococcos and moraxella to be causative bacteria.

Thygeson (1948) published an article showing pneumococcus to be the commonest organism responsible for corneal ulcer.

Sorsby and burn ,(1950) found following analysis in their studies

CASES OF HYPOPYON	CASES OF CORNEAL ULCER WITHOUT HYPOPYON
Pneumococci 36%	B pyocyaneous 1
Staph. aureous 4%	B proteus and B subtilis 1
Moras Axenfield 4%	B pneumococci and gram negative bacilli 1
Staph. albus with bacterium xerosis 40%	Staph. Albus ,pneumococci and B Xerosis 1
Sterile 10%	

Nema et al (1966) found staph . Aureus to be the commonest bacteria cultured from corneal ulcer and reported as staph. Albus 43.3%, staph. aureus 31.96%, Dipthroids 18.56% , Ps. Pyocyaneous 13.4%, Strepto. viridians 7.32%, pneumococcus 3.9% , proteus 1.03%.

Bal and Nema ,(1967) found following bacteriological analysis in cases of corneal ulcer as staph. Coagulase negative 33.4% , staph coagulase positive 12.9% S. Aeruginosa 5.9%

Rohtagi (1967) publised a paper on study of becteriology of corneal ulcer and reported following analysis.

HYPOPYON CORNEAL ULCER		CORNEAL ULCER WITHOUT HYPOPYON	
Staph. Albus (coagulase + ve)	16%	Staph. Albus	22.6%
Staph.Albus (coagulase -ve)	28%	Staph. Aureus	1.74%
Staph. Aureus	4%	Staph.albus with with diptheroids	8.7%
Staph. Asbus with C.B Diptheroids	12%	Strepto. Viridian	24.9%
C.B Diptheroids	24%	Pneumococcus	13.9%
Staph. Albus with diptheroid	8.7%	Ps.Pyocyaneus	3.5%
Strepto. Viridians	4%	E. coli	0.9%

Jain et al (1970) has shown staph albus 30% , coagulase negative to be the commonest offending organism with staph Aureus 15%, Moraxella Axend field 13% and kochweek bacillus in 13% being other causative organism.

Charles P. Adams and coworkers in 1983 said that contact lenses are also the cause of corneal ulcers. They analysed 6 patients out of the 124 patients. They found on culture that gram negative rods

grew three were pseudomonas organism and one case serratia organism.

Samples, Jr. and Buttner in 1983 said that biological insecticide have become increasingly popular but they apparently have some pathogenecity for humans as well. The patients he described was splashed a solution of biological insecticide containing bacillus thuringiensis in his right eye. Severe corneal ulcer developed was susceptible to treatment with gentamycin ointment.

In 1986 R. Maske, JC hill and S.P.Oliver studied microbiological study of 48 patients with corneal ulcer due to bacterial infection. Positive culture of corneal ulcer were obtained in 60% of all patients, about half of these patients had received antimicrobial treatment prior to sampling. A relative high incidence of Staphylococcus epidermis was isolated from ulcer patients 27%. Gram stains of ulcer samples were positive for organisms in only 27% of all patients.

In 1987 Eduardo Alfonso, Kenneth K Kenyan and co-workers evaluated three cases of pseudomonas Aeruginosa corneo scleritis, one associated with the use of contaminated eye drops, another in a debilatated patient and third who had previously undergone keratoplasty.

In 1987 John C. Hill and Paul Potter described the treatment of Mooren's corneal ulcer which cyclosporine A. They reported three cases of severe, bilateral, progressive mooren's corneal ulcer

unresponsive to medical and surgical treatment were treated with cyclosporine A.

In 1987 Raymond M. Stein Elisabeth J. Cohen found corneal ulcer after a dental hook accidentally penetrated cornea of a patient during routine dental care. Next day patient had mucoprulent discharge a paracentral corneal was found. Corneal scrapping was performed and gram stain showed many white blood cells, a few pleomorphic gram negative rods, gram positive cocci.

In 1989 Jems P. Dunn and Bartly J. Modino and co-workers observed that old 4 patients developed corneal ulcer associated with the use of disposable extended wear hydrogel contact lenses. bacteria were recovered from corneal ulcer of three patients.

In 1989 Anne V. Parker Elisabeth J. Cohen studied three cases in which corneal abrasion caused by artificial finger nails resulted in severe pseudomonas corneal ulcer.

In 1990 T.R. carmidrael and Y. Gefland found from a prospective randomized trail on forty selected patients with bacterial corneal ulcer. Two groups were compared, one was treated with antibiotics only and the other with antibiotic plus steroid and complications were similar in both groups. No delay in healing rate aws observed with the use of tropical steroid.

In 1991 Madan P. Upadhyay et al found that corneal ulcer is one of the most frequent causes of blindness in developing countries. they studued 405 patients with corneal ulcer in Nepal. The most

common predisposing cause of corneal ulceration was corneal trauma usually with organic agricultural material. Microorganisms were grown from 80% of the ulcers. Pure bacterial culture were obtained from 63.2% of the patients whereas fungal culture were obtained from 6.7% of the patients. In 10% cases corneal ulcer show a mixed growth of bacteria and fungi. The most commonly isolated organism in the series was Streptococcus pneumoniae. Other frequently isolated bacteria included staphylococcus epidermidis, s. aureus and pseudomonas species.

FUNGUS INFECTION IN CORNEA

Theodore Laber first reported aspergillitis of the cornea in 1979, mycotic keratitis has been the subject of occasional case report, however in 1959 there appeared six new cases of fungus keratitis.

There has been several warnings of the danger of the use of cortisone in ocular infection, namely in articles of Wood 1952, Hogan et al 1954, Moser and Allen 1952. Most suggestive are the cases reported by Thygeson et al 1953 and Mitusi and Hanabusa 1955 in which fungus keratitis supervened during the course of topical cortison therapy for a variety of other ocular conditions.

The role of antibiotic and corticosteroid drugs has not been determined definitely, however there is increasing evidence to induce both specially the coticosteroid group.

In 1959 Fine and Zimmermann stated that infections of the cornea have recently been observed and reported with increasing. Most of these infections have developed has complication of superficial corneal injuries of other preexisting corneal diseases in patients who had been treated with antibiotics and corticosteroid prepartions.

After Birger review in 1953, 9 cases of fungus keratitis were reported whithin next few years. The recent increase in the keratomycoses has also been parallel by a rise in reports of intraocular fungus infections.

Antibiotics enhance the growth by inhibition of normal bacterial flora while steroids facilitate fungus prolifiration through interference with the host. The hazards were reported three years ago by Duke Elder 1958 and Goldsmith. Recently the same has been confirmed by Nema and Ahuja.

In 1954 Conaut showed that pathogenic fungi produced corneal ulcer while Ley 1956 and Agarwal and Khosla 1967 demonstrated that non-pathogenic fungi may also produce corneal ulcer.

Anderson and Chick 1963 found 9 cases of mycotic corneal ulcer.

Fusarium sp.	: 4
Candida Albicans	: 1
Aspergillus Versicular	: 1
Curvalaria Lunata	: 1
Fusidium Terricola	: 1

Agarwal and Khosla in 1967 described six cases of mycotic corneal ulcer

Candida Albicans	: 2
Aspergillus Fumigatus	: 2
Candida Krusie	: 1
Fusanum	: 1

Sood et al 1968 concluded that their 20.1% hypopyon corneal ulcer were victims of different fungi.

Puttana in 1969 published another series of 34 cases of keratomycosis and stated that clinically a fungal ulcer starts as fluffy white spot with satellite lesions which soon breaking into shallow ulcer with surrounding infiltrated and soon hypopyon follows.

Nema et al in 1970 found their 35.3% cases of corneal ulcer were mycotic in origin.

F.Ray Jones, Gerald R. Christenson in 1973 reported a case of sustained corneal abrasion from organic material. Patient used anti-biotic corticosteroid ointment and developed a corneal ulcer. The common contaminant Pullularia pullulans was isolated from corneal scrappings on two separate occasions. Topical application of amphotericin B was ineffective. Ulcer was improved by topical application of natamycin.

In 1981 L.C.Dutta et al studied 100 cases of corneal ulcer and found that in 32 cases of corneal ulcer culture of fungus Aspergillus was the commonest type of fungus seen in these cases.

In 1981 S.L.Sharma reported 100 cases of corneal ulcer, 43 were female and 57 were male. Following types of fungus could be identified on culture.

1. Aspergillus : 10
2. Mucor : 4
3. Rhizopus : 1
4. Penicillum : 3
5. Unidentified : 1

In 1986 Carman Santrs, James Parker reported a case of a person taking treatment for candida albican corneal ulcer of left eye. It was treated with topical amphotericin B and oral ketaconazole. He recovered from ailment. After some month he complained of having severe pain, swelling and decreased vision in another eye. On examination there was a central corneal ulcer in right eye. Gram stains of ulcer showed yeast formus compatible with candida. Culture from the ulcer yielded C.Albican, Staphylococcus aureus, alpha hemolytic streptococci and klebsiella. All bacteria were sensitive to chloramphanicol. Patient improved with this treatment. As a result of homosexual and intravenous drug users, this patient was at high risk for developing Acquired Immune Deficiency Syndrome. He have never demonstrated a frank evidence of AIDS,

but have persistent generalised limphadenopathy, a syndrome closely related to AIDS and to infection with HTV - III virus. He suggested that the candida corneal ulcer in this patient resulted from immunologic abnormalities secondary to HTLV - III infection. The development of fungal corneal ulcer in patient at risk for AIDS may be another type of opportunistic infection.

In 1986 S.L.Sharma, R.Bajaj and Rajive Sharma studied 510 cases of corneal ulceration and found the presence of fungus as causative organism. Fungus was found in 87 cases (17.5%). Most common fungus found was aspergillus. History of trauma specially with vegetative matter and the application of steroids for one purpose or the other is a factor of importance for causing corneal ulceration.

S. Mahashabde, M.C.Mahta and V.Srivastava in 1987 used three different antifungal agent 1. Nystatin ointment 2. Amphotericin B drops 3. Econazol ointment in cases of keratomycosis. They concluded from their clinical trail that Econazol 1% ointment is a safe and effective antifungal having wide range of antifungal activity.

In 1988 L.M.Molbach, A.A.Bialasiewicz reported a case who was diabetic and had an exogenous L. Monocytogenes infection with a corneal ring ulcer. L.Monocytogenes is agram positive, nonspore forming, non-acid fast diptheroid like rods with a tumbling motility at room temperature, which may cause life threatning granulomatus lesions in new born and adults.

In february 1991 Bruce M Zagebaum et al reported case who smoked crack cocaine regularly and developed fungal candida albican corneal ulcer.

VIRAL INFECTIONS

In 1950 Thygeson, Kimura and Hogan became concerned about the apparent increase in incidence of chronic diseases and perforation with knowledge of several cases in which perforation occured with no use of corticosteroid. Dendritic, dendrogeographic or geographic eruptions of the cornea are caused by live virus. Von Horn et al have reported little inflammatory cell reaction (polymorphonuclear leukocytes but no B-lymphocytes) in this disease, but many free viruses lying in intra and extra cellular locations particlurly in tha basal epithilium. With antiviral chemotherapy the infectious epithilial disease is resolved 80-90 %. Indeed the use of steroid in infectious disease serves only to make ulceration spread and prolong the infectious phase of the disease.

Bruce Ostler in 1978 used glucocorticoid in the treatment of herpes simplex keratitis. When used to treat acute dendritic lesions glucocorticoid may disseminate the virus worsen the keratitis and predispose to superinfection.

Data from laboratory indicate when there is a dentritic, HSV is recovered from eye in 80% of cases unless the patient has been using idoxuridine (IDU), when a geographic ulcer is noted, virus is recovered in 30% of cases. When the epithelial defect is round

or oval with smooth edges suggesting trophic type of lesion. These data shows that replicating HSV plays a significant role in dentritic and geographic type of ulceration.

In 1978 Bartly J. Mondino, Stuart J. Brown said that corneal manifestation of herpes zoster are diverse and potentially serious. Corneal epithelium may display a coarse punctate keratitis, vasicles mucus plaques and dendrites:

In 1986 L.M.T. Collum & P.McGettrick and others take sixty patients with simple dentritic corneal ulceration were randomely assinged to double blind treatment with either acyclovir tablets or acyclovir ophthalmic eye drops administred 5 times daily. There was no difference in proportion of patients healed in either group. No systemic and significant side effects were noted in either treatment group. Though levels of acyclovir in tear film of those who recieved oral preparation were within the range of mean in vitro I.D. 50 levels for herpes simplex virus type I. We conclude that oral administration of acyclovir for 100 m.g. 5 times a day may be an effective alternative to topical therapy in selected patients.

In 1987 Stephan C. Pflugflder, Roger Soulson and Soul Ullman reported that parepheral corneal ulceration has been associated with numerous sytemic immunologic disorders. They treated a patient with AIDS related complex who developed a parepheral ulceration that appeared to be similar to that occuring in othet immunologic disorders in which circulating immune complexes are found.

In 1987 Allen Foster and Alfred Sommer examined 130 children with corneal ulceration to determine the cause of ulceration. They found that 375 of ulcers were associated with recent Measles infection and 38% of children had bilateral ulceration. Herpes simplex was the commonest cause of ulceration but vitamin A was the major cause of bilateral ulceration.

MATERIAL & METHODS

MATERIAL AND METHODS

The present study was conducted on 50 cases of corneal ulcer, admitted in wards, a detailed case sheet was made to record the name, age, sex, occupation, address and general health of the patients. It could also record the day to day progress of the cases clinically with the time period when the patient was admitted to the wards and when he was discharged. A detailed record was also made of the salient features of local examination of the eyes.

1. Name of the patient
2. Age, Sex, Caste
3. Patient's occupation
4. Socio-economic status; Monthly income and size of the family
5. Nutrition
6. General health of the patient
7. Time of hospitalisation
8. Onset of diseases.

   Time of start of symptoms was noted and a detailed enquiry of how the disease started was recorded.
9. Symptoms of the disease with which it started were recorded as pain, photophobia, lacrymation, headache and diminution of vision.

Socio-economic status and nutrition were given attention. Each patient was inquired about size of his family, number of earning

members and average monthly income of the family. Patients were grouped into following socio- economic groups:

High

Middle

Low

The enquiry was made if he is vegetarian, habitual or occasional non vegetarian, constituents (carbohydrates, protiens, fat) and quality of each article in his diet. Total protien and calories intake was calculated.

After recording a brief history of the case as above the external examination of the eye was done to record the signs of the disease by oblique illumination method. A good source of light was placed about two feet away from the patient's eye, laterally and slightly in front and the light was concentrated upon the portion of the cornea and other structures of the eye to be examined. The loup which was a strong magnifying glass held in other hand infront of illuminated area which was to be examined and looking through it. Each case was also examined with the help of slit lamp. Details of each and every structure of eye was written in the following heads.

1. Lid
2. Conjunctive
3. Cornea
4. Lacrymal Apparatus
5. Anterior chamber

6. Iris and pupil
7. Vision
8. Tension

1. LIDS

Corneal inflammation in our country is mostly due to trachoma which is a chronic contagious disease of conjuctiva and cornea, so it is necessary to examine lid margin whether enverted (entropian) or everted (ectropian). Thickening of lids and trachiasis should also be noted.

2. CONJUNCTIVA

Congestion and inflammation of conjunctiva (whether circum corneal or conjunctival), palpeberal conjunctiva was also examined.

3. CORNEA

Staning of cornea - This test was used in our study as to correctly know the extent, margins and other features of corneal ulceration. The substance employed was freshly prepared 2% fluorescein alkaline solution. A drop of this was instilled into the conjunctival sal. The excess of fluorescein was washed away, leaving any area in which surface layer of cornea was looking or a bright green delinated. The descemet's membrane is not stained, so that the sides of very deep ulcer showed the stain.

4. LACRYMAL SAC

Conjuctival congestion or signs of irritation such as watering, should lead us to suspect the eficiency of the lacrimal apparatus. Simple epiphora or a flow of tear on the cheeks may be due to malposition of the lower puctum or blockage of the canaliculi. The presence of distension and inflammation of the lacrimal sac should also be noted. If the sac is distended, the contents - lacrimal fluid, mucus, pus may regurgitate into the conjunctival sac by way of canaliculi. Special methods of testing the patency of the lacrimal passages i.e. syringing with normal saline is done.

5. ANTERIOR CHAMBER

It is examined with oblique illumination and slit lamp and the patient is in sitting position and observed in lower quatrant.

6. IRIS

Same method of examination is used in case of iris and its colour, cleanliness and pattern was examined very carefully. A case was taken to examine exudates and adhensions of the Iris to the corneal surface. Muddiness of Iris is caused by inflammatory exudates.

7. PUPILS

In the routine examination of corneal inflammation the condition of pupil is examined in the affected eye and was compared with normal eye. Many of the patients have treatment outside, hence their pupil were under the effect of Mydriasis. The size, shape and

contour of each pupil were examined carefully. Margins of pupil were carefully seen for exudates

8. TENSION

Tension was recorded by Schiotz tonometer if possible.

9. VISION

Recorded with Snellen's test chart in literate cases and landolth broken ring chart in illiterate ones to have an idea of acquity of vission in the affected eye. But in most cases due to photopholia & corneal odema and ulceration, it is not possible for patient to read the chart so the hand movements and finger counting at various distances were employed and recorded.

After achieving clinical diagnosis and before applying any medicine scrapping were taken from the floor and edges of the corneal ulcer and inoculated in sabourauds medicines for culture of fungus and Mecankey's Agar and blood Agar for bacterial culture.

After corneal scrappings routine treatment was started. All these patients were provided well balanced diet. Their daily diet contained 2500 calories and 60 gm proteins.

BACTERIOLOGICAL STUDIES

1.Culture and identification of organisms

(I) use of media

(a) Blood Agar (b) Mecankey's Medium

2. Study of colony character

3. Grams staining

4. Biochemical Reactions

(II) Antibiotic sensitivity- All the culture media thus inoculated were incubated at 37 C for 24-48 hrs. After incubation the culture plates were taken out and they were axamined in details.

Size, shape, surface, margin, opacity or transluency, pigment production etc., were all noted, one of the colony was picked and slide was made by putting it in the drop of saline already kept on slides and spreading it uniformely. Smears were fixed and stained with Gram's stain and then seen under microscope.

Staining character of bacteria were recorded. Biochemical reaction and other tests were carried out to identify the particular organisms.

STUDY OF FUNGUS

Incubation period -- the specimen was inoculated on Sabouraud's medium and incubated for 15-20 days at 28°C. The growth of fungi was checked periodically. The test tube showing no growth were incubated upto 4 weeks and if still no growth appeared than they were assumed to be steriled.

LABORATORY STUDY

Tubes with positive fungal growth were subcultured in order to get pure growth of organism. The colony chracteristic of the growth

of various fungi were carefully studied. The colour, size and consistency of various calories were carefully recorded.

In the microscopic study of the organism the direct culture mounts on the slide in a drop of Lacto Phenol cotton blue were prepared of each organism from fresh growth and were studied in low power and high power of microscope. The nature of the hyphae (filaments) and the types of spores were studied.

After completion the microscopic organisms were finally identified and were correlated with clinical diagnosis. A very careful record of the progress of each patient was done.

OBSERVATION

OBSERVATIONS

In accordance with the method discribed 50 cases of corneal Ulcer have been examined. It has been observed that corneal Ulcer is more prevalent in males than in females as evident from Table No.I.

Table No.I

Prevalence of corneal Ulcer in different sexes

Sr.No.	Sex	No. of patients	Percentage
1.	Male	30	60%
2.	Female	20	40%
	Total	50	100%

Second thing which was observed indicates that persons of 20-40 years of age group are more prone to corneal ulcer than those belonging to other age groups as shown in table No. II

From the given below table it is evident that children also contribute a big percentage of case of corneal ulcer. It is most likely because of games played by them e.g. Bows, and arrow, goolidanda etc., nutritonal dificiency and poor resistance to infection.

Table No. II

Prevalence of corneal ulcer in different age groups

S.No.	Age of groups	No. of patient	Percentage
1.	0 - 10 years	12	24%
2.	11 -20 years	7	14%
3.	21 -40 years	23	46%
4.	41 -60 years	5	10%
5.	Above 60 years	3	6%

In accordance with the division of social economic group it has been found that corneal ulcer is more common in low socioeconomic group as evident from table No. III.

Table No. III

Prevalence in different socioeconomic group

S.No.	Socio economic group	No. of patients	Percentage
1.	Low	40	80%
2.	Middle	8	16%
3.	High	2	4%
	Total	50	100%

It has been observed that nutrition plays a difinite role in causation of corneal ulcer. People whose calories intake is less than 1500 daily have been found to be the foremost victim of corneal ulcer .

Similarly who could get only 1500 - 2000 calories which are insufficient even for non working person contributed a big share, while those getting more than 3000 calories daily were in little number as evident from table no.IV

Table No. IV

Prevalence with regard to daily caloric intake

S.No.	Daily caloric intake	No. of patients	Percentage
1.	Less than 1500	27	54%
2.	1500 -2000	14	28%
3.	2000 -3000	6	12%
4.	More than 3000	3	6%
	Total	50	100%

It is observed that majority of cases of corneal ulcer were those who were unable to get even thiry grams of protein daily in their diet, while on the other hand those getting more than 50 grams of protein daily were less often victim of corneal ulcer as is evident from table No. V

Table No. V

Prevalence with regard to daily protein intake

S.No.	Daily protein intake	No. of Patients	Percentage
1.	30 grams	27	54%
2.	30 -50 grams	15	30%
3.	Above 50 grams	8	16%
	Total	50	100%

It is found on enquiring that only few cases were habitual and some occasional non vegetarian, while majority of patients was vegetarian as evident from table No. VI

Table No. VI

Prevalence with regard to food habit

S.No.	Food habit	No. of patients	Percentage
1.	Vegetarian	42	84%
2.	Occasional non Vegetarian	7	14%
3.	Habitual Non Vegetarian	1	2%
	Total	50	100%

OCCUPATION

It has been observed that corneal ulcer is most prevalent in farmers and factory workers , while least prevalent in office workers, as evident from Table No. VII. It is because of the reason that farmers and factory workers are much more exposed to trauma and thus more prone to corneal ulcer . Their diet is also insufficient in protein and chiefly consisting of carbohydrate.

Table No. VII

Prevalence in different occupations

S.No.	Occupation	No. of Patients	Percentage
1.	Farmers	20	40%
2.	Factory Workers	12	24%
3.	Housewife	5	10%
4.	Business men	2	4%
5.	Students	3	6%
6.	Clerks	2	4%
7.	Others	6	12%

Another observation was that conjunctivitis and trauma are the commonest precipitating factors of corneal ulcer as can be seen from table No. VIII. Pathogenic bacteria present in the conjunctival sac, in cases of mucopurulent or purulent conjunctivitis donot allow superficial corneal ulcer to heal. Trauma causes corneal abrasion and thus provide a seat for growth of bacteria already present in the conjunctival sac.

Table No. VIII

Prevalence with regard to precipitating factor

S.No.	Precipitating factor	No. of Patients	Percentage
1.	Trauma	15	30%
2.	Conjunctivitis (Mucopurulent or purulent)	11	22%
3.	Entropion	4	8%
4.	Trichiasis	4	8%
5.	Chemical burns	2	4%
6.	Keratomalacia	6	12%
7.	Unknown	8	16%

On clinical examination it was found that the central part of the cornea is nearly two times prone to ulceration than the peripheral part as is shown in table no. IX, It may be due to poor nuturition of the central part of the cornea in comparison with peripheral part which also nourishment from perilimbal plexus of blood vessels .

Table No. IX

Site of ulcer

S.No.	Site of Ulcer	No. of patients	Percentage
1.	Central	27	54%
2.	Peripheral	16	32%
3.	Not differentiated	7	14%

We study about the size of the ulcer and concluded following analysis as in table No. X.

Table No. X

Size of ulcer

S.No.	Size of Ulcer	No. of Patients	Percentage
1.	Less than 2 m.m.	9	18%
2.	2 - 5 m.m.	23	46%
3.	More than 5 m.m.	12	24%
4.	Whole cornea	6	12%
	Total	50	00%

We also observed the depth of the Ulceration whether superficial or deep as seen in table No. XI.

Table No. XI

Table No. XI

Depth of ulcer

S.No.	Depth	No. of Patients	Percentage
1.	Superficial	32	64%
2.	Deep	18	36%
	Total	50	100%

Similarly we also observed sloughing and non sloughing Ulceration as evident from table No. XII.

Table No. XII

Slough of ulcer

S.No.	Ulcer	No. of patients	Percentage
1.	Sloughing	12	24%
2.	Non Sloughing	38	76%

It has been obserdsved that complication of cornea ulcer are not uncommon and occur in 38% of patients on analysing , it has been found that iridocyclitis , Hypopyon and secondry glucama are the most common complication while descematocele formation, perforation contribute fair percentage as is evident from table no. XIII.

Table No. XIII

Complications of ulcer

S.No.	Complication	No. of patients	Percentage
1.	Iridocyclitis	9	18%
2.	Hypopyon	4	8%
3.	Secondry Glaucoma	2	4%
4.	Perforation	1	2%
5.	Dascematocele	2	4%
6.	Anterior Staphyloma	1	2%
7.	Phthysis Bulbi	0	0%

It has been observed that those patients given special protein rich diet , healed earlier than those who were provided ordinary diet as evident from table No. XIV.

Table No. XIV

Effect of nutrition on duration of health

S.No.	Ward Stay	Ordinary diet	Special diet
		Patients	Patients
1.	7 days	2 (8%)	4 (16%)
2.	8 - 14 days	5 (20%)	9 (36%)
3.	15 -21 days	15 (60%)	11 (44%)
4.	21 days	3 (12%)	1 (4%)

It has been observed that the resultent opacity after healing corneal ulcer in patients on special diet was of leucomatous type

while in those on ordinary diet , It was of macular and nebular type as evident from table no. XV

Table No. XV

Effect of nutrition on depth of opacity

S.No.	Corneal opacity	Patients on ordinary diet	Patients on special diet
1.	Nebular	2 (8%)	3 (12%)
2.	Macular	10 (40%)	12 (48%)
3.	Leucomatous	13 (52%)	10 (40%)
	Total	25 (100%)	25(100%)

BACTERIOLOGY

Bacteriological studies revealed that more than three fourth of corneal ulcers are infected with different bacteria as is evident from Table No. XVI.

Table No. XVI

S.No.	Organism	No.of patients	Percentage
1.	Bacteria	40	80%
2.	Fungi	4	8%
3.	Negative culture	6	12%

It was also observed that Staph. aureus and Staph. epidermidis were found to be the commonest organism as is shown in Table No. XVII.

Table No. XVII

S.No.	Bacteria	No. of patients	Percentage
1.	Staph.aureus	16	32%
2.	Staph.epidermidis	13	26%
3.	Ps. aeruginosa	5	10%
4.	Proteus	2	4%
5.	Pneumococcus	1	2%
6.	Strepto . viridans	1	2%
7.	B. subtilis	1	2%
8.	E. coli	1	2%

Bacteriological analysis in relation to socio economic groups shows that staph. aureus and Ps. aeruginosa are, the commonest bactria in high socio economic group, while in low socio economic group Staph. epidermidis and Staph aurueus are almost equally prevalent as evident from table No. XVIII.

Table No. XVIII

Incidence of bacteria in different socio-economic group

S.No.	Socio economic group	Bacteria	No.of patients	Percentage
1.	Low	a. Staph epidermidis	13	39.30%
		b. Staph aureus	12	36.30%
		c. Ps.aeruginosa	4	12.10%
		d. Proteus	1	3.03%
		e. Strepto.viridans	1	3.03%
		f. B.Subtilis	0	0%
		g. Pneumococcus	1	3.03%
		h. E. coli	1	3.03%
2.	Middle and High	a. Staph aureus	4	57.10%
		b. Ps.aeruginosa	2	28.50%
		c. Staph epidermidis	1	14.28%
		d. Proteus	0	0%

MYCOLOGY

Mycotic study of corneal ulcer revealed that fair percentage of cases of corneal ulcer are mycotic in orgin as is evident from table No. XIX.

Table No. XIX

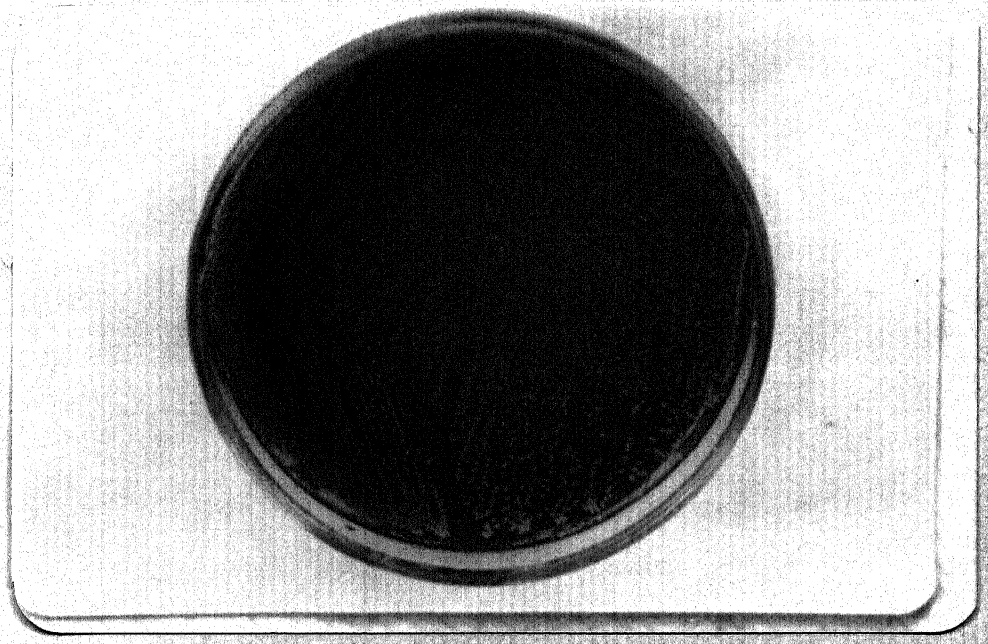
Pathogenic Fungi

S.No.	Fungi	No. of patients	Percentage
1.	Aspergillus	2	4%
2.	Candida	1	2%
3.	Rhodotoreula	1	2%
4.	Sacchromyces	0	0%
	Total	4	8%

VIROLOGY

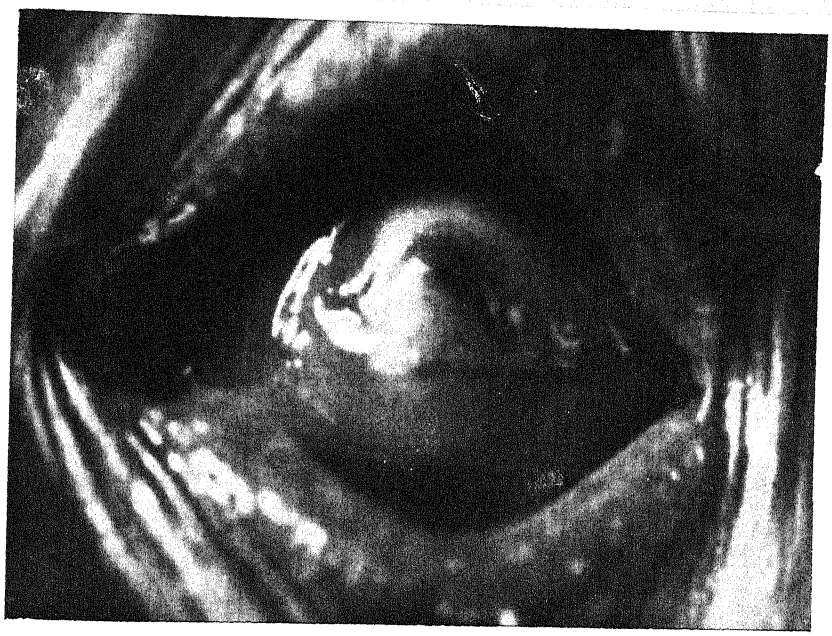
Since virus culture facility is not available in our college, so on clinical diagnosis we observed six cases of Herpes simplex corneal ulcer.

PHOTOGRAPH NO. 1



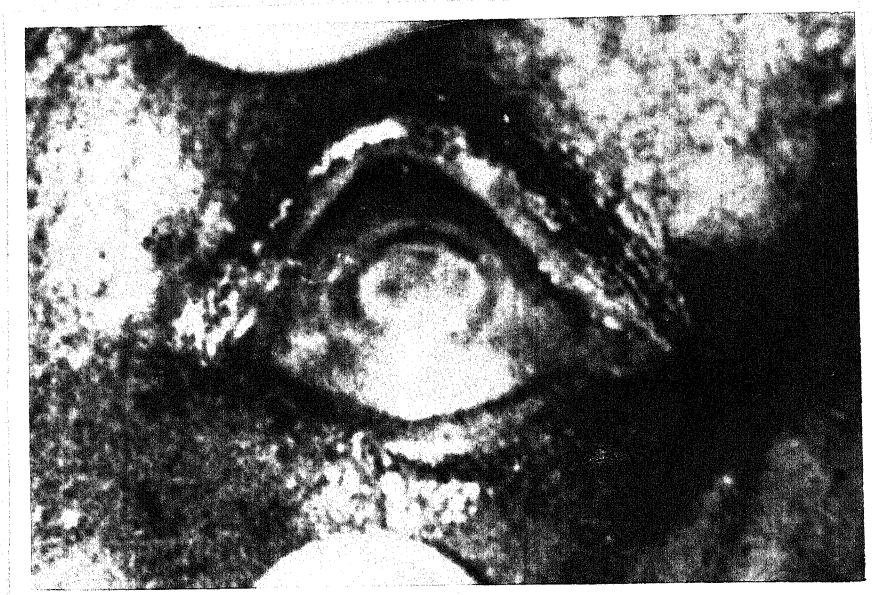
Staphylococcal Culture
On Blood Agar

PHOTOGRAPH NO. 2



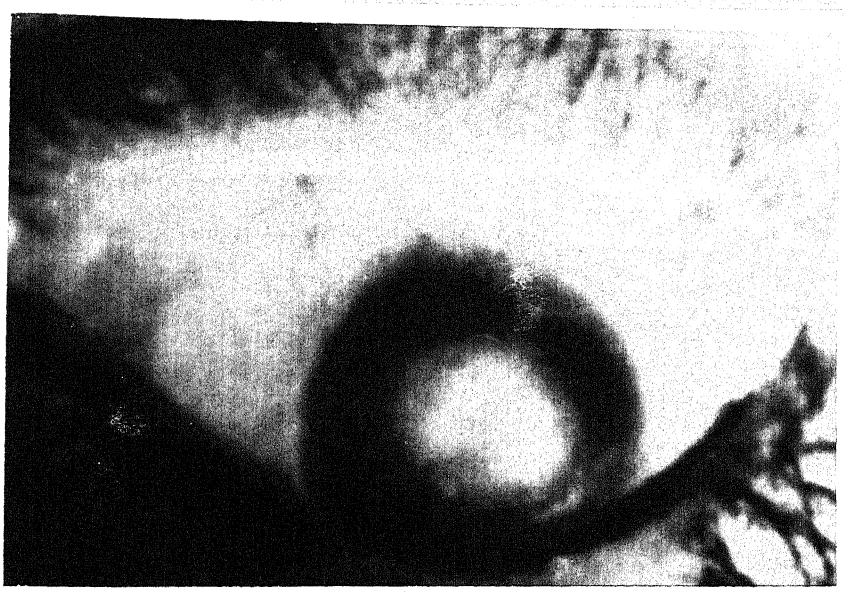
Central Corneal Ulcer

PHOTOGRAPH NO. 3



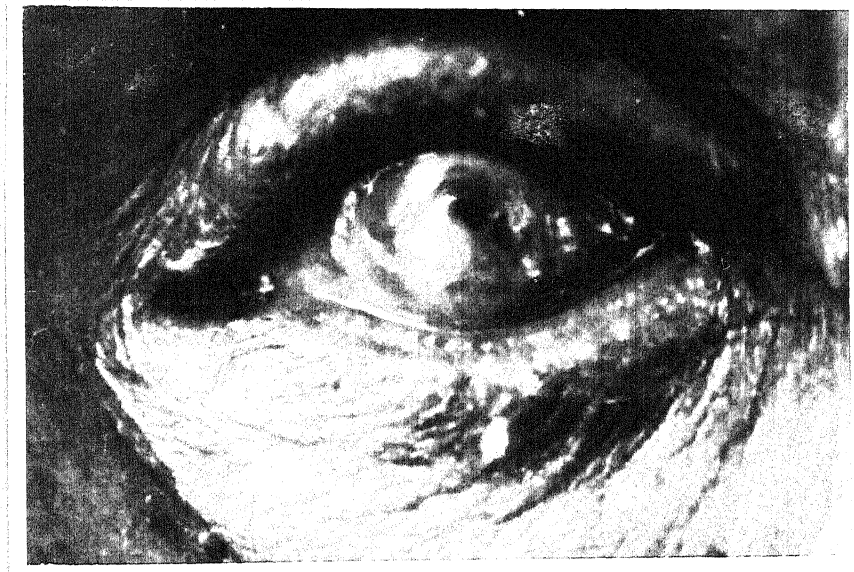
Sloughing Corneal Ulcer

PHOTOGRAPH NO. 4



Mycotic Corneal Ulcer

PHOTOGRAPH NO. 5



Healing Corneal Ulcer

DISCUSSION

DISCUSSION

Despite the familiarity of the entity for centuries and disastrous complication and sequlae ophthalmologists have not been able to overpower it sufficeintly. In different years conflicting reports have been comming up regarding its various etiological factors, This led us to explore some aspects of this entity.

It has been found that corneal ulcer is more prevalent in males 60% than female 40% . Hence this finding is quite similar to Nema and Shukla , 1966, who showed the prevalence to be 62.6% in males and 37.6 in females. Sood et al also found this entity to be more common in males 57.3% than females 42.7% . Most probably higher incidence of corneal ulcer in males is due to the fact that they have much longer outdoor life and are thus more exposed to trauma and more prone to have corneal ulcer than female.

This was also found that this entity is common in age group of 21-40 years 46% and 0-10 years 24% . Prevalence in age group of 11- 20 years and 41-60 years is 14% and 10% respectively , while only 6% above the age group of 60 years . In this respect this observation is similar to Nema et al who reported highest incidence of 23.8% in age group of 21-30 years . Sood et al noted the highest incidence 49.6% below age of 40 years . Most probable reason of highest incidence in this age group of 21-40 years seems to be due to the fact that majority of working population falls in this age group and thus more exposed to trauma and more prone to corneal ulcer.

Further it has been found that the entity is most prevalent in low socioeconomic group 40% and least prevalent in higher strata 2% while middle group 8% prevalence. On this aspect we agree with Jain et al 1970 who found 82.6% prevalence in low socio economic group. It has been found that only 2% cases were real non vegetarian while 84% were vegetarian and 14% occasional non-vegetarin. This further significes that corneal ulcer is much more prevalent in person, whom diet lack in first class protein. Thus clinically estableshes role of first class protein.

On comparative study of patients put on special diet contanning 3000 calories and 70-80 grams protein and patients kept on ordinary diet, It has been observed that ulcer heals much earlier in patients on special diet than those on ordinary diet.

Another observation which was noted is that corneal opacity is thinner and smaller in special diet patients than ordinary diet patients.

Several workers in different years have pointed about the role of different components of nutrition. While Harvey and Howes 1930 and Shaffer 1946 have stressed on role of protien in healing of ulcer, Friedenwald et al 1945 , Mc carrison 1945 and Schmidt 1947 have found vitamin A to enhance healing of corneal ulcer. Similarly several workers such as Gough 1933,Crandon 1941, Buschke and Mitchel 1943 and Bourne 1962 showed vitamin c to cause quick healing of corneal ulcer, while Di prima and Krishan Dutta 1953 have separately shown nicotinic acid to cause early healing of

corneal ulcer. Duke elder 1938 and Parsad et al 1968 reported that Dianobol enchances healing of corneal ulcer by causing positive protein balance.

It is evident from observation that perhaps these are not the individual components, but it is high caloric protein enriched general nutrition which limits the expansion of corneal ulcer and promotes its healing process. Difficiency of protein leads to poor resistence to infection , So they are antinfective also. So protein is a vital component. Protein are required in abundance by virtue of their being vital components. So if well balanced diet is provided to the patient there is no need of additional vitamin therapy except in cases having some specific deficiency.

It is also observed that corneal ulcer is most prevalent in farmer 40% and factory workers 24% . While other occupation such as students 6% housewife 10%, Bussinesmen 4%. Thus we agree with Nema et al 1966 who found highest prevalence 27.1% in farmers. We also agreed with Upadhya et al 1991 who found highest percentage 49.6% in farmers . Sood et al 1967 showed farmers to be cheif victim of this entity . Similarly Dickson 1942 found it most common in miners 56.8% because of approximity of his working place to mines. Most probably this higher prevalence of entity in farmers and factory workers is due to the fact they are much more exposed to trauma than individuals of any other occupation and so are more prone to corneal ulcer than others.

It has been observed that trauma 30%, conjunctivitis 22%, Keratomalacia 12% are most common precipitating factors of corneal ulcer, while Entropion 8%, Trichiasis 8%, Chronic Dacryocystitis 2% , and chemical burns 4% are other factors. Most likely it is due to bacteria present in cojunctival sac, case of mucopurulent or purulent conjunctivitis , which do not allow to heal superficial corneal abrasion. These abrasions which would have otherwise healed unnoticed are converted into ulcer by the bacteria.

Keratomalacia causes ulcer by devitalization of corneal epithelium and thus removing epithelial barrier to growth of bacteria. Childern suffering from Keratomalacia have verious nutritional deficiencies and poor resistance to infection. Sood et al 1967 found that their 70.6% of cases of age group 0-10 years were suffering from Keratomalacia. Entropion and trichiasis seems to cause ulceration by traumatizing cornea, while dacryocystitis play similar role to conjunctivitis as lacrymal sac in these cases is permanent source of supply of pathogenic organism to conjucnctival sac. Chemicals cause the ulcer by their destructive effect.

On clinical examination of ulcer, it has been observed that central part of the cornea is more prone to corneal ulcer than peripheral part. While 54% of the ulcers were central and 32% of ulcers were peripheral. Most likely it is due to poor nutrion of central part in comparision with peripheral part which gets nutrition from perilimbal plexus of blood vessels.

Similarly study of the size of ulcer revealed that majority 46% of ulcers are 2- 5 m.m. in size and whole cornea is involved in 12% cases. Ulcer of less than 2 m.m. in size account for only 18% cases while ulcer of more than 5m.m. in size occur in 24% cases. On study of depth of ulcer it has been found that superficial ulcer are in 64% cases and deep ulcer are in 36% cases. Similarly it has been found that sloughing corneal ulcer occur in 24% of cases and non sloughing corneal ulcer occur in 76% of cases.

It is observed that complications of corneal ulcers are not uncommon and occur in 30% cases. Iridocyclitis has been found to be most common 15% complication, while hypopyon 10%, perforation 4% and descematocele formation are other important complication observed. Phthysis bulbi and anterior staphyloma occur in 2% cases each.

On bacteriological study it has been found that Staph aureus 32%, Staph epidermidis 26% and Ps. aeruginosa 10% are most common causative organism of corneal ulcer, while Proteus, E coli 2%, Pneumococcus 2%, Bacillus subtiles 2%, Streptococcus viridans 2% are other causative bacteria. Thus this finding is quiet similar to Juler and Young 1945, and Nema and Shukla 1966 who have also shown Staph aureus to be cheif causative organism. In work of Rohatgi 1967 and Jain et al. 1970 also this organism has been responsible in big percentage of cases. Staph. albus has been reported as commonest causative organism by Bal et al 1967 and Jain et al 1970, Rhodes 1934, Dickson 1942 and Sorsby and Burn

1950, Upadhayay 1991 found it to be the second commonest organism. Ps. aeruginosa which stood third in this study has also been responsible for fair percentage of cases by Juler and young 1945, Bal et al 1967 and Upadhayay et al 1991. Although pneumococcous has been reported by different workers such as Browing 1927, Thygeson 1948 and Sorsby and Burn 1950, to be chief causative organism. It seem to be no more common and is responsible for 2% cases. Similarly streptococcus reported to be one of commonest causative organism by Rohatgi 1967 and Upadhayay et al 1991 is no more common and so are diptheroid which have been shown as commonest causative organism by Dickson 1942 and Tulsidas et al 1956. E. Coli Proteus , B.subtilis have almost same place in works of others .

Further analysis of bacteriological findings revealed Staph aureus 10% and Ps. aeruginosa 5% to be the commonest causative bacteria in high and middle Socio economic groups, while Staph. epidermidis 39.3% and Staph aureus 36.3% are almost equally prevalent in low socioeconomic group.

It has been found that 8% cases are caused by fungi , while Aspergillus was present 2% , Candida 1% ,Rhodotorcula 1% and sacchoromyces 0% . Aspergillus and candida have been also been shown to cause corneal ulcer by Anderson and Chick 1963, Gingrich 1963, Agrawal and Khosla 1967, Puttana 1967 and Awasthi and Yadav 1970, L C Dutta 1981, S L Sharma 1986 and Updhayay et al 1991.

SUMMARY AND CONCLUSION

SUMMARY AND CONCLUSION

In the present study 50 cases of corneal ulcer were examined with the aim to explore certain important clinicopathological aspects of corneal ulcer. Mode of onset of the ulcer was known in different nutrititional strata. Prevalence of the entity in different sexes, age groups, scocioeconomic status, occupation and nutrional strata was found out. Important characters and complication of the ulcer were noted and analysed. Corneal scrapings of the corneal ulcer were taken and complete bacterioligical and fungal examination was carried out. Every patient was put on protein rich diet while rest were kept on routine diet. The effect of treatment was noted in each case. Effect of nutrition on ulcer was noted by comparative study of duration of healing of ulcer, size and depth of resultant opacity.

Following facts have been brought to light:

1. Corneal ulcer is more prevalent in males 60% than females 40%

2. Incidence of corneal ulcer is highest in age group of 21-40 years 46% and 0-10 years 24%.

3. Prevalence of corneal ulcer is highest in low socio economic group and minimum in high socio economic group.

4. Farmers 40% and factory workers 24% are foremost victims of corneal ulcer.

5. Trauma 30% mucopurulent & purulent conjunctivitis 22% and malnutrition (Vitamin A dificiency in children) 12% are most important precipitating factors.

6. Central part of the cornea is more prone 54% to ulcer than peripheral part of the cornea 32%.

7. Iridocyclitis 15%, Hypopyon 10% and Perforation 4% are most common complications of corneal ulcer.

8. The high caloric protein diet causes early healing of corneal ulcer.

9. 80% of corneal ulcer are caused by differnt bacteria and Staph aureus 32%, Staph epidermidis 26% and Ps. aeruginosa 10% are common offending bacteria.

10. In high and middle socio economic groups Staph.aureus 57% and Ps. aeruginosa 28.5% are the commonest causative organism while in low socio-economic group these are Staph epidermidis 39.3% and Staph aureus 36.3%.

11. 8% of the cases are caused by different fungi.

12 Aspergillus 2% was most common offending fungi while candida 1% and rhodotorcula 1% were also found .

13. 6% of the cases are suspected to be caused by diffrent viruses.

14. Herpese simplex virus was found in 6% cases.

BIBLIOGRAPHY

BIBLIOGRAPHY

1. Aetins of Amida and wood A.C. (502-575 A.D.) : Memorandum book of tenth century occulist chicago, North Western University. 1936.

2. Agrawal L.P. & Khosla. Mycotic Keratitis. Journal of All India ophthalmic society. 15, 1: 1. 1967.

3. Allen foster and Alfred sommer. Corneal ulceration, measles and childhood blindness. British journal ophthal. 71:331-343. 1987.

4. Anne V. Parker et al. Pseudomonas corneal ulcer after artificial fingernail injuries . American journal ophthal . 107, No. 5: 548. 1989.

5. Anderson B, Robert J. and Chick E.W. Mycotic Ulcerative Keratitis Arch Ophthal 62:169-179. 1959.

6. Arthur Ellison, and Robert Poirier. Therapeutic Effects of Heparin on Pseudomonas Induced cornral Ulceration. American journal ophthal.82: 619-627. 1976.

7. Awasthi P and Yadav. Ocular pathogens. Indian Journal of ocular pathology., 69. 1970.

8. Bal A. and Nema H.V. Bacteriology of corneal ulcer, Acta ophthal, 45 : 247- 250. 1967.

9. Bartly J Mondino, Stuart I Brown. Peripheral corneal ulcers with Herpeszoster ophthalmicus . American journal ophthal.86: 611-614. 1978.

10. Baum J. Treatment of Bacterial ulcers of the cornea in the Rabbit. American journal ophthal. 96 : 132. 1983.

11. Bartly J Mondino et al. Corneal ulcers associated with daily wear and entended wear contact lenses. Americal journal Opthal. 102: 58-65. July 1986.

12. Birger H L. Modern Ophthal by Sorsby. 2 : 253. 1963.

13. Browing. Trans Ophthal Soc. of U.K. 1927.

14. Bruce M. Zagelbaum et al. candida Albicans corneal ulcer associated with crack cocaine. American journal ophthal. 111: 248. 1991.

15. Carmen Santos et al Bilateral fungal corneal ulcers in a patient with AIDS- Related Complex. American journal Ophthal. 102, No. 1:118. July 1986 .

16. Carolyn M et al spontaneous fungal corneal ulcer as an ocular memifestation of AIDS. American journal Ophthal . 104, 3 : 302. 1987.

17. Charles P. Adam et al . corneal ulcer in patients with cosmetic extended wear contact lenses. American journal ophthal. 96, 6:705-709. Dec.1983.

18. Dey . American Journal ophthal. 42: 59. 1956.

19. Dickson R.M. Traumatic ulcer of cornea with Sp reference to coal miners. British journal ophthal. 829; 1942.

20. Duke Elder's . Text Book of ophthalmology , St.Louis, The C.V. Mosby company, Vol. II, 1593-1628. 1938.

21. Duke Elder's Text Book of ophthalmology. Henry Kimpton, London, 1: 471-474. 1942.

22. Duke elder'text book of ophthalmology. Vol. VIII, Henry Kimpton London. 1938.

23. Duke Elder's text book of ophthalmology. Vol. IV. Henry Kimpton London. 1943.

24. Eduardo Alfonso et al. Pseudomonas corneoscleritis . American journal ophthal. 103: 90- 98. Jan. 1987.

25. F Ray Jones , Gerald R christensen . Pullularia corneal ulcer. Arch ophthalmol. 92: 529-530. Dec. 1974.

26. Friedenwald et al. journal nutrition. Cited by Duke Elder's Text Book of Ophthal. Henry Kimpton London. 29: 299. 1945.

27. Fine and Zimmerman . American journal ophthal. 48: 151-163. 1959.

28. George O Waring. Glucocorticoid Therapy in Ocular Herpes Simplex. Survey ophthalmology . 23: 35-36. 1978.

29. G.K. Sharama et al. evaluation of topical povidone iodine versus gentamycin in staphylococcus positive corneal ulcer. Indian journal ophthal. 38 : 30-32. 1990.

30. Gilbert Smolin, Masao Okumoto and Robert A. Nezik. Microbial flora in entended wear soft contact lens wearers. American journal ophthal 88:543- 547. 1979.

31. Gingrich W.D. Fungus diseases etiology, Infectious disease of conjunctiva & Cornea cited by sood et al. Orient Arch. Ophthal. 100-108. 1968.

32. Henkis H.E. Ophthalmologica. 112: 113-128. Sept. 1946.

33. Jain et al. Indian journal of ocular pathology. 69. 1970.

34. James P Dunnet et al. Corneal ulcer associated with disposable Hydrogel contact lenses . American journal ophthal. 108:113-177. 1989.

35. John D L Beare. Eye injuries from assault with chemicals. British journal ophthal. 74:514-518. 1990.

36. John R samples, Helmut Buettner. Corneal ulceration caused by a biological insecticide. American journal ophthal. 95: 258- 260. 1983.

37. John C Hill and Paul Potter . Treatment of mooren's ulcer. British journal ophthal. 71. No. 1: 11-15. Jan. 1987.

38. Joseph M googe et al pyogenic granulomas of the cornea. Survey of ophthalmology. 29: 188-190. Dec. 1984.

39. Jonsson G et al . Vitamin for cornea. 12:300. 1942.

40. Juler F. & Young M Y . British journal of ophthal. 29: 312. 1965.

41. Kaufman. Mycotic keratitis. American journal ophthal. Vol. 59. No. 6. 993. June 1965.

42. Karla J. Johns et al. Pseudomonas corneal ulcer associated with colored cosmetic contact lenses. American journal ophthal. 105 ,No. 2. 210. 1988.

43. Kenyon KR. Inflammatory mechanism in corneal ulceration. Americal journal ophthal 101: 752. June 1986.

44. Knitove . Modern trends in ophthal. 391. 1947.

45. Ley and sanders. Fungus keratitis, Arch. ophthal. 56 : 257-264. 1957.

46. L.C. Dutta , Dulal Dutta , P Monanty and J. Sarma. Study of fungus keratitis. Indian journal of ophthal. 29:407-409. Dec. 1981.

47. L.M. Molbach et al. Necrotizing ring ulcer of the cornea caused by exogenous listeria monocytogenes serotype IV b infection. American journal ophthal. 106, No. 1:105 , 1988.

48. Madan P Upadhayay et al. Epidemiologic , Characterstics, Predisposing factors and etiological diagnosis of corneal ulceration. American journal oplhthal. 111:92-99. 1991.

49. Mitusi and Hanabusa. Corneal infections after cortisone therapy. British journal ophthal. 39: 244-250. 1955.

50. Moser. Ophthalmologica. 123:313-316.1952.

51. Moore R.A. A text book of pathology . W.B. Sanders Co. Philedelphia. 153-156. 1948.

52. Michel M L et al. Rheumetoid arthritis and sterile corneal ulceration . American journal ophthal. 98. No. 5: 669. Nov. 1984.

53. Murray PI and Rachi AHS. Pathogenesis of Mooren's ulcer. British journal ophthal. 68: 182-187. 1984.

54. Nema H.V. and Shukla. Traumatic corneal ulcer.Orient Arch ophthal 197-210. 1966.

55. Patterson. Trans. Ophthal. Soc. of U.K: 51. 1932.

56. Puttana St. Mycotic infections of cornea. All India Ophthal. Soc. 15:11-18 . 1967.

57. Prasad V.N., Gupta H.C. & Shukla N. journal of All India ophthalmology. 17: 31-32. 1969.

58. Puttana ST.Journal of All India ophthal Sciences. 17 L, 5: 171. 1969.

59. Raymond M. et al. corneal ulcer resulting from dental instrument injury . American journal ophthal. 103, Part I: 334. 1987.

60. Rhodes AJ. British journal ophthal. 23:627.1939.

61. Rohatgi JN. Bacteriology of corneal ulcer with special reference to Hypopyon corneal ulcer .Journal All India ophthal society.15:54-57.1967.

62. Rogers FC. British journal ophthal. 34: 107. 1950.

63. Richard A. et al. Anaerobic capnocytophaga corneal ulcer. American journal ophthal. 105, :427. April 1988.

64. Samples J. Rand Buettner H. Occular in fection caused by a biological insecticide. American journal ophthal. 97 : 675 May 1984.

65. Schmitke RL. Arch ophthal. 37,653. 1947.

66. Sorsby A and Klein M. British journal ophtahal. 27: 241. 1943.

67. Sood NN. , Rotanraj A Shenoy BP & Madhav HN. Hypopyon Ulcer. Orient Arch ophthal. 6: 93-99. 1968.

68. Sorsby Arnold and Burn. British journal ophthal. 34: 16. 1950.

69. S.L. Sharma . Keratomycosis in corneal sepsis . Indian journal ophthal. 29:443- 445. Dec. 1981.

70. S.L. Sharma et al. Keratomycosis in corneal sepsis . Indian journal of All India ophthal Society . 35, No. 5 & 6 : 143-145 . 1987.

71. S. Mahashabde et al. Study of antifungal drug in mycotic corneal ulcer. Indian journal of All India ophthalmic society. 35, No. 5 and 6: 149-152. 1987.

72. Stephen C et al. Peripheral corneal ulceration in patient with AIDS related complex. American journal ophthal. 104, No. 5: 542. Nov. 1987.

73. Thygeson. Marginal corneal ulcer. Trans American Acad Ophthal.51:198.1947.

74. Thygeson. Trans American Acad Ophthal. 54 : 64. 1953.

75. Thygeson. Acute central hypopyon ulcers of the cornea. Californ Med. 69 : 18-21. 1948.

76. T R Carmichael et al. Topical steroid in the treatment of central and paracentral corneal ulcers. British journal ophthal.74: 528-531. 1990.

77. Tulsidas et al. British Journal Ophthal. 39:21. 1955.

78. Wendell E willis and peter R Laibson. Intractable mycobacterium fortuitum corneal ulcer in man. American journal ophthal. 71: 500- 503. 1971.

79. Wolf E. The anatomy of eye and orbit. 6th edition. H.K.Lewis and Company Ltd., London. 1968.

80. Wood AC. British journal ophthal. 36: 401-431. 1952.

81. Zimmerman LE. American journal ophthal. 45: 827. 1958.

APPENDIX

PROFORMA

PROFORMA FOR EXAMINATION

Case No. Dated:

1. Name of investigator :
2. Surgeon I/C :
3. Place : Department of Ophthalmology
   M.L.B.Medical College,Jhansi.

DETAILS OF PATIENTS

1. Name :
2. Age / Sex :
3. O. P. D. No. / M.R.D. No. :
4. Occupation :
5. Address :
6. Socio- economic status :

(A) Presenting Symptoms :

1.
2.
3.
4.
5.

(B) Brief H/O Present illness :

(C) Past History :

Tuberculosis

Diabetes

Any other

(D) Family History :

History of active immunization in family member or known case of tubercular of neighbour .

(E) Perinatal History

(F) H/O Immunization

GENERAL EXAMINATION

General appearance / built,

Vitals,

Pallor,

Jaundice,

Cyanosis,

Clubbing,

Hydration,

Oedema

Lymphadenopathy,

SYSTEMIC EXAMINATION

Head

Face- Symmetry

Orbit	Right eye	Left eye
Eye brow		
Eye lashes		
Eye lid		
CONJUNCTIVA		
Bulbar		
Palpebral		
CORNEA		
Size		

Shape

Curvature

Luster

Transparency

Sensitivity

Others

ANTERIOR CHAMBER

Depth

Contents

IRIS

Colour

Surface

pattern

Others

PUPIL

LENS

VISUAL ACUITY

TENSION

DIAGNOSIS

INVESTIGATIONS

BLOOD : T L C , D L C , Hb, E S R , BLOOD SUGAR,

URINE : Albumin and sugar and microscopic examinations.

Conjunctival swab culture sensitivity.

Corneal swab culture sensitivity.